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Date: October 25, 1993

Mr. Ken Walker
Atlantic Division, Naval Facilities Engineering Command
Environmental Quality Division
Code: 1822
Building N 26, Room 54
1510 Gilbert Street
Norfolk, Va 23511-2699

Re: Norfolk Naval Base - Norfolk, Va.
Camp Allen Landfill, Areas A & B
Preliminary review of the draft final *Remedial Investigation Report, Baseline Risk Assessment, and Feasibility Study*

Dear Mr. Walker:

The U.S. Environmental Protection Agency (EPA) has preliminarily reviewed the draft final *Remedial Investigation Report, Baseline Risk Assessment, and Feasibility Study* for the Camp Allen Landfill at the Norfolk Naval Base, and we offer the following comments and concerns:

Draft Final Remedial Investigation Report

1. Page 1-6, 4th paragraph

The draft *Report* mentions an incinerator that was operated at the Camp Allen Landfill location from the mid-1940's to the mid-1960's, and that materials too bulky (?) for the incinerator were burned in Area A of the Camp Allen Landfill. Were the soil samples taken from the Camp Allen Landfill analyzed for dioxins ??

2. Page 1-14, 4th paragraph

Volatile organics were detected in 3 of the deep monitoring wells at Area A, downgradient of the Camp Allen landfill. Is the deep aquifer referred to here the Yorktown aquifer?

3. Page 1-17, 2nd paragraph

The draft *Report* noted that volatile organics were detected in all three deep monitoring wells for Area B of the Camp Allen landfill. Is this deep aquifer the Yorktown aquifer?

4. Page 1-18, 1st paragraph

It is important to note that the water table aquifer recharges the Yorktown Aquifer via an erosional breach in the confining clay layer separating the aquifers.

5. Page 2-7, Table 2-1

It is very important to note that the Yorktown aquifer is adequate for moderate public and industrial water supplies. Thus, the Camp Allen is impacting an aquifer that has the potential to be a drinking water source.

6. Page 2-10, Section 2.6.1, 2nd paragraph

Does the Columbia aquifer have the potential to be a drinking water source?

7. Page 2-18, Table 2-2

If possible, it would be beneficial to add pH to the list of parameters in Table 2-2.

8. Page 3-22, Section 3.2.4

Were the soil samples collected and analyzed as discrete samples or were the samples composited?

9. Page 3-22, Section 3.2.5

Were the sediment samples collected and analyzed as discrete samples or were the samples composited?

10. Page 4-5, Figure 4-2

Why wasn't the geophysical coverage extended a little further south to confirm that metal objects or fill was not deposited south of line 1+80 EAST.

11. Page 4-60, Paragraph 5

EPA has some concern over the presence of a "seepage area" identified on the southern bank of the drainage ditch behind the Camp Allen School, especially when field sampling results indicated detections of trichloroethylene and dichloroethylene. The source area of this seep should be identified.

12. Page 4-65, Section 4.5.2, 4th paragraph

EPA has some concern over the "...extensive dumped debris..." in the drainage ditch surrounding the Camp Allen Landfill. Does this drainage ditch or a portion of the drainage ditch border the property line between the Naval Base and other private parties? Is there evidence of possible contaminate migration from the Naval Base to off-post property?

13. Page 4-66, Section 4.5.2, 2nd paragraph

Why was there sample refusal at four inches in the drainage ditch located adjacent to Glenwood Park?

14. Section 4.5.4, General comment

Were there any abnormalities noted in the macroinvertebrates observed? Were the macroinvertebrates observed pollution tolerant species?

15. Section 4.5.5, General comment

Were there any abnormalities noted in the terrestrial organisms observed? Were the terrestrial

organisms observed pollution tolerant species?

16. Page 5-5, Table 5-1

Why were metals not analyzed for in the subsurface soils?

17. Page 5-10, Table 5-5

Why were metals not analyzed for in the subsurface soils?

18. Page 5-20, Table 5-13

Why wasn't Beryllium analyzed for in the surface soils?

19. Page 5-41, Table 5-24

It appears that the detection limit for Beryllium is too high. Please check Virginia Water Quality Standards/Criteria for Beryllium limits and adjust the analytical methods accordingly.

20. Page 5-75, Table 5-36

It appears that the detection limit for Beryllium is too high. The MCL is 1 µg/l/

21. General Comment, Section 5.1

Below is a summary of the maximum concentration of the contaminants of concern found at Area A of the Camp Allen Landfill:

Maximum Con. of contaminants of concern found in subsurface soils

2-butanone	-	17	mg/kg
Toluene	-	3,000	mg/kg
Benzo(a)pyrene	-	0.165	mg/kg
2,4-dimethylphenol	-	41	mg/kg
Dieldrin	-	0.089	mg/kg
Aroclor 1254	-	1.6	mg/kg
Aroclor 1260	-	1.8	mg/kg

Maximum Con. of contaminants of concern found in surface soils

Aroclor 1260	-	0.42	mg/kg
Arsenic	-	70	mg/kg
Chromium	-	121	mg/kg
Barium	-	1,050	mg/kg
Cadmium	-	88.9	mg/kg
Lead	-	683	mg/kg
Thallium	-	0.92	mg/kg

Maximum Con. of contaminants of concern found in sediment

Arsenic	-	590	mg/kg (exceeds NOAA ER-M concentration)
Chromium	-	3,000	mg/kg (exceeds NOAA ER-M concentration)
Mercury	-	3	mg/kg (exceeds NOAA ER-M concentration)

Maximum Con. of contaminants of concern found in sediment (continued)

Lead	-	1,000	mg/kg (exceeds NOAA ER-M concentration)
Silver	-	110	mg/kg (exceeds NOAA ER-M concentration)
Vanadium	-	190	mg/kg
Benzo(a)pyrene	-	0.570	mg/kg
Aroclor 1260	-	1.5	mg/kg (exceeds NOAA ER-M concentration)

Maximum Con. of contaminants of concern found in surface water

1,2-dichloroethene	-	4	µg/l
Dieldrin	-	0.027	µg/l
Aroclor 1254	-	0.44	µg/l
Total Beryllium	-	DETECTION LIMIT TOO HIGH	
Total Chromium	-	104	µg/l
Total Cobalt	-	13.2	µg/l
Total Vanadium	-	103	µg/l
Total Copper	-	446	µg/l
Total Lead	-	800	µg/l
Total Mercury	-	3.9	µg/l
Total Zinc	-	1,860	µg/l
Endrin	-	0.07	µg/l
Alpha-Chlordane	-	0.015	µg/l
Gamma-Chlordane	-	0.024	µg/l

Maximum Con. of contaminants of concern found in ground water

	<u>Shallow aquifer</u>	<u>Deep aquifer</u>
Vinyl Chloride	3,300 µg/l	100 µg/l
Trichloroethene	1,800 µg/l	100 µg/l
Tetrachloroethene	620 µg/l	14 µg/l
1,2-dichloroethene	6,100 µg/l	540 µg/l
Methylene Chloride	57 µg/l	
Benzene	310 µg/l	
Toluene	5,400 µg/l	
2,4-dimethylphenol	1,400 µg/l	
2-methylphenol	1,800 µg/l	
4-methylphenol	21,000 µg/l	
Phenol	1,800 µg/l	
1,2-dichloroethane		38 µg/l
Chloroform		8 µg/l
Aldrin	0.026 µg/l	
Dissolved Arsenic	200 µg/l	
Dissolved Barium	6,060 µg/l	

22. General Comment, Section 5.2

Outlined on the next page is a summary of the maximum concentration of the contaminants of concern found at Area B of the Camp Allen Landfill:

Maximum Con. of contaminants of concern found in subsurface soils

2-butanone	-	10 mg/kg
Dieldrin	-	1.5 mg/kg
Aroclor 1254	-	9.5 mg/kg
Arsenic	-	60.5 mg/kg
Barium	-	1,480 mg/kg
Beryllium	-	5.6 mg/kg
Mercury	-	0.68 mg/kg
Thallium	-	2.0 mg/kg

Maximum Con. of contaminants of concern found in surface soils

Camp Allen Elementary School vicinity

Landfill Area B General vicinity

Antimony	-	7.8 mg/kg	Cadmium	-	20.5 mg/kg
Arsenic	-	25.1 mg/kg	Arsenic	-	13.8 mg/kg
Chromium	-	869 mg/kg	Chromium	-	44.3 mg/kg
Lead	-	213 mg/kg	Lead	-	251 mg/kg
Zinc	-	2,570 mg/kg	Aroclor 1260	-	0.780 mg/kg

Maximum Con. of contaminants of concern found in sediment

Camp Allen Elementary School vicinity

Landfill Area B General vicinity

Benzo(a)pyrene	-	0.230 mg/kg		
4,4'-DDT	-	2.5 mg/kg	(exceeds NOAA ER-M concentration)	
Aroclor 1254	-	7.6 mg/kg	(exceeds NOAA ER-M concentration)	
Antimony	-	16.0 mg/kg		
Arsenic	-	52.45 mg/kg		
Beryllium	-	0.76 mg/kg		
Cadmium	-	41.9 mg/kg	(exceeds NOAA ER-M concentration)	
Chromium	-	225.0 mg/kg	(exceeds NOAA ER-M concentration)	
Copper	-	22,700 mg/kg	(29,000 mg/kg emergency removal action threshold guidance)	
Lead	-	1,750 mg/kg	(exceeds NOAA ER-M concentration)	
Mercury	-	19.35 mg/kg	(exceeds NOAA ER-M concentration)	
Nickel	-	1,255 mg/kg	(exceeds NOAA ER-M concentration)	
Vanadium	-	542 mg/kg		

Maximum Con. of contaminants of concern found in surface water

Camp Allen Elementary School vicinity

Landfill Area B General vicinity

Vinyl Chloride	-	22.0 µg/l
Acenaphthene	-	0.7 µg/l
Bis(2-ethylhexyl)phthalate	-	7.0 µg/l
Total Copper	-	27.1 µg/l
Total Lead	-	53.6 µg/l
Total Zinc	-	202.0 µg/l
Dissolved Zinc	-	111.0 µg/l
Dissolved Barium	-	151.0 µg/l

Maximum Con. of contaminants of concern found in ground water

<u>Shallow aquifer</u>			<u>Deep aquifer</u>		
	<u>CAE School vicinity</u>	<u>Landfill Area B</u>		<u>CAE School vicinity</u>	<u>Landfill Area B</u>
Vinyl Chloride	940 µg/l	315 µg/l			3 µg/l
1,2-dichloroethene	1,600 µg/l	230 µg/l		9 µg/l	16 µg/l
Benzene	410 µg/l	11 µg/l			12 µg/l
1,2-dichloroethane	180 µg/l	62 µg/l		450 µg/l	170 µg/l
Trichloroethene	520 µg/l	230 µg/l		35 µg/l	18 µg/l
Tetrachloroethene	10 µg/l				
4-methyl-2-pentanone		525 µg/l			

<u>Shallow aquifer (combined)</u>				<u>Deep aquifer (combined)</u>			
4-methylphenol		13 µg/l					
Antimony	Total	28.7 µg/l	Dissolved	32.9 µg/l	Total	25.2 µg/l	
Arsenic	Total	93.6 µg/l	Dissolved	51.1 µg/l	Total	194.0 µg/l	
Beryllium	Total	18.5 µg/l			Total	11.2 µg/l	
Cadmium	Total	17.8 µg/l			Total	30.8 µg/l	
Chromium	Total	774.5 µg/l			Total	542.0 µg/l	
Lead	Total	1,020.0 µg/l			Total	183.0 µg/l	
Mercury	Total	3.0 µg/l					
Nickel	Total	433.0 µg/l			Total	203.0 µg/l	
Vanadium	Total	1,610.0 µg/l			Total	769.0 µg/l	
Zinc	Total	1,550.0 µg/l			Total	985.0 µg/l	

23. General Comment, Section 5.3

Below is a summary of the maximum concentration of the contaminants of concern found at Areas A and B of the Camp Allen Landfill:

Maximum Con. of contaminants of concern found in the air surrounding the Brig Facility

Bromomethane	-	0.9 µg/m3
Methylene Chloride	-	380.0 µg/m3
Chloroform	-	0.8 µg/m3
1,1,1-trichloroethane	-	3,400.0 µg/m3
Benzene	-	1.0 µg/m3
Toluene	-	670.0 µg/m3
M/P Xylene	-	100.0 µg/m3
Styrene	-	8.9 µg/m3
1,4-dichlorobenzene	-	26.0 µg/m3
Benzyl Chloride	-	0.9 µg/m3
Hexachlorobutadiene	-	1.0 µg/m3

Maximum Con. of contaminants of concern found in the air surrounding the CA Elementary School

Benzene	-	0.7 $\mu\text{g}/\text{m}^3$
1,4-dichlorobenzene	-	0.6 $\mu\text{g}/\text{m}^3$
Hexachlorobutadiene	-	0.3 $\mu\text{g}/\text{m}^3$

24. Page 5-160, Table 5-77

It is unclear what is meant by the heading of this Table as being "Ambient" air. Is the term ambient inferring that the "ambient" air sampled is considered background? It is strange that the ambient air had concentrations of dichlorodifluoromethane, bromomethane, methylene Chloride, 1,1,1-trichloroethane, benzene, toluene, m/p-xylenes, and hexachlorobutadiene. EPA considers the "ambient" air sampled not to be true "background" samples. The volatile/semi-volatile concentrations detected in the "ambient" air around the Camp Allen Landfill could have originated from the surface water/sediments located in the channels surrounding the site, as well as from other sources on the landfill or in the immediate vicinity.

25. General Comment, Table 5-83

Below is a summary of the maximum concentration of the groundwater contaminants of concern detected in residential wells bordering the Camp Allen Landfill:

Tetrachloroethene	-	10 $\mu\text{g}/\text{l}$
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26. Page 6-11, 4th paragraph

Conclusions drawn in this paragraph for inorganic contaminants are erroneous as adequate establishment of background concentrations was not accomplished in the draft RI Report.

27. Page 6-16, 2nd paragraph

Conclusions drawn in this paragraph for inorganic contaminants are erroneous as adequate establishment of background concentrations was not accomplished in the draft RI Report.

28. Page 7-9, 5th paragraph

Inorganic sediment contamination is of concern to EPA.

29. Page 7-15, Section 7.8, 1st paragraph

EPA believes the inorganic contamination in soils and sediment is of a concern.

30. Page 7-16

Conclusions drawn on this page concerning "background" concentrations are erroneous as adequate establishment of true background conditions has not been presented in the draft RI Report.

EPA does not agree with the conclusions contained in the draft RI Report based upon the data presented therein.

Draft Final Baseline Risk Assessment

The Draft Final *Baseline Risk Assessment* for the Camp Allen Landfill at the Norfolk Naval Base has been reviewed. A number of concerns and deficiencies were noted and comments are as follows:

1. It should be noted that methodology exists through EPA Regional Guidance Documents that allows for the selection of contaminants of concern on a consistent scientific basis. EPA-Region III has developed risk based screening criteria that subjects each contaminant to the same level of scrutiny and used uniform health based criteria as the major criterion for selection. The use of MCLs as a screening criterion may not be protective of human health and is not technically consistent because MCLs are not wholly based on human health criteria. For example, the combined increased cancer risk derived for residential exposure to vinyl chloride approaches $1.0E-04$ at the MCL, while risks due to some other contaminants at their MCLs may be lower, and others even higher. It is obvious that the utilization of criteria based upon a consistent assigned risk level is superior to the approach mentioned above.
2. No documentation is provided which justifies the elimination of numerous contaminants from consideration as contaminants of concern for Area A. Complete sets of data including actual sample results, ranges of contaminant concentrations, maximum contaminant and background sample results, and screening criteria used for the selection of contaminants of concern should be included in this document for complete evaluation.
3. The ubiquitous nature of PAHs alone does not justify elimination of these compounds as contaminants of concern in Area A surface soils. Please provide all relevant information.
4. Please provide additional documentation for the elimination of pesticides as contaminants of concern in surface soils in Area A.
5. The selection of specific metals as contaminants of concern in Area A and Area B soils should be based upon site specific background sample results, statistical determination of significant differences between site samples and background, and health based screening criteria. Since inorganic constituent concentrations vary greatly from one locality to another, it is imperative that site specific background be employed for making this and other related determinations of contaminants.
6. The actual value of the inclusion of Tables 2-1 and 2-2 in this document is questionable. The inclusion of site specific background soil data is most appropriate and would provide the desired answers related to the proper identification of the contaminants of concern and for making relevant identification of contaminants thought to be present at concentrations above background levels.
7. In Section 2.1.2.1, adequate documentation is not provided to justify the elimination of methylene chloride and 2-butanone as contaminants of concern. It is acknowledged that these contaminants are common laboratory contaminants, but this reasoning alone is not adequate for their elimination from consideration. Were "B" qualifiers associated with the sample values for these two contaminants?
8. Please clarify the assumptions made regarding the elimination of PAHs and pesticides from consideration as contaminants of concern in Area B.
9. As previously indicated for Area A, site-specific background should be used to evaluate metals in Area B and at the elementary school.
10. No comparative evaluation of the actual semivolatile sample results for surface water were presented to demonstrate that they did not exceed levels of concern. (Section 2.2.1.) Table 2-3 presents the

screening criteria, but not the sample results. This table alone is of limited value.

11. The elimination of Aroclor 1254 (Section 2.2.1.) from consideration as a contaminant of concern appears to be subjective and based upon speculation. Please provide documentation to support the stated viewpoint, or eliminate the information from the document.
12. Please present documentation to support the statements in Section 2.2.1. concerning the presence of pesticides in sediment samples being related to atmospheric deposition. This appears to be speculative. Please provide documentation to support the statements made in the draft *Report*. Additionally, utilize the site specific background samples collected as a part of the investigation to determine what is and is not site related.
13. In Section 2.2.2.1 acetone and 2-butanone are again eliminated as contaminants of concern because they are common laboratory contaminants. Please provide the justification for these determinations.
14. In Section 2.2.2.1 a determination is made to eliminate pesticides and PCBs found in deep sediments from consideration as contaminants of concern. If future use is taken into consideration, it does not seem reasonable to eliminate these contaminants completely.
15. Questions remain about the elimination of pesticides as contaminants of concern in Section 2.2.2.1 due to the lack of supporting documentation.
16. There is concern for the absence of organic analyses for the sediment samples at the elementary school (Section 2.2.2.2). It is obvious that volatile organic contaminants would not be prevalent in surface water at that location due to volatilization, but it is reasonable to expect to see volatiles, semivolatiles, and pesticides in the sediments. It does not seem reasonable to assume that since only inorganics were significantly detected in surface water that sediments would follow suit. Pesticides for example, are not very soluble in water and would probably be in sediments.
17. Section 2.3 deals with groundwater. As previously stated, MCLs are not necessarily based upon health criteria and should not be used as the sole basis for screening of contaminants of concern. It is suggested that uniform health based criteria, such as is used in EPA-Region III, be instituted for that purpose.
18. EPA Guidance states that in order to be protective of human health, and to assure that the reasonable maximum risk is assessed when exposure to groundwater from monitoring wells is being assessed, the central portion of the groundwater plume should be selected for the calculation of the exposure point concentration. Unlike soil exposure, where the receptor may migrate to various points around the site and contact contaminants in the soils, the groundwater plume may migrate to the receptor. Therefore, the concentrations of contaminants at the center of the plume are selected for evaluation.
19. There is considerable concern related to the screening of only organic constituents in the residential wells at this site. If there is site-specific justification for this analytical approach it should be presented. The text presented in Section 2.3.2 provides no information that is viewed as being valid justification for screening organics only.
20. With respect to comments made in Section 2.3.2 concerning PCE, it should be noted that volatile organic concentrations may vary greatly between wells and even in the same well over time. It should also be noted that detection limits of the wells in question are not listed.
21. Again, a contaminant is eliminated from consideration as a contaminant of concern because it is a common laboratory contaminant (Section 2.3.2., 2-butanone). Please provide documentation for this

determination.

22. Please justify statements made in the final paragraph on page 2-17 concerning organic contaminants in residential wells not be site related. It is not reasonable to assume that these contaminants are background. Given the close proximity of the residential wells to the Camp Allen Landfill, it is not unlikely that the Landfill maybe the source of the residential contamination.
23. (Section 2.3.3) As previously stated, MCLs and related criteria may not be adequate means alone for the selection of contaminants of concern. Risk based criteria should be employed.
24. In Section 2.4.1 it is stated that dichlorofluoromethane, trichlorofluoromethane, freon 114, and methylene chloride were detected in ambient air samples but were not retained as contaminants of concern. It should first be noted that RAGS indicates that contaminants that pose a risk to receptors must be evaluated even if they are determined not to be site related. These risks should be evaluated separately from those that are site related. It should also be noted that a statement is made indicating the methylene chloride, among the other contaminants mentioned was not identified in other site media. This in fact may not be true, since methylene chloride was detected in several other media, but has been eliminated as a contaminant of concern due to the fact that it is a common laboratory contaminant. Please note that the documentation for this claim has not been presented in this document.
25. At the top of page 2-20 statements are made relating to methylene chloride and toluene as common laboratory contaminants. The text indicates that neither compound was detected in trip blanks, so what is the basis for determining that they represent laboratory contaminants in this case?
26. In the next paragraph it is mentioned that 1,4-dichlorobenzene was detected at concentrations less than 5 µg/m³ at 4 ambient air monitoring stations. Please note that the increased cancer risk associated with 5 µg/m³ of 1,4-dichlorobenzene is ambient air exceeds 1.5E-05. As previously stated, contaminants contributing to the risks of receptors are to be evaluated in accordance with RAGS. What levels of 1,4-dichlorobenzene were found in background samples? Please present scientific justification for determinations made concerning this contaminant. (Section 2.4.1)
27. Evaluation of hexachlorobutadiene as a contaminant of concern in air should be based upon risk based levels of concern and concentrations of the contaminant relative to background. (Section 2.4.1) Are there large numbers of gyroscopes used or stored at the site in or near the Brig?
28. Receptors are not capable of distinguishing and excluding contaminants that are not site related from those that are in their bodies. As previously stated, RAGS indicates that all contaminants contributing to the overall risks of receptors at a site should be evaluated, with risks that are thought to not be site related calculated separately. The risk due to 1,1,1-trichloroethane may need to be handled in this fashion, if it is indeed determined to not be site related. It should be noted that no appropriate documentation is provided to support the case, and that information which is supplied seems to be speculative. No background data or other scientifically relevant information is provided. Note that the Hazard Index value calculated for residential exposure to the maximum cited level of 1,1,1-trichloroethane in air exceeds 365. Is this acceptable? It is not reasonable to exclude this risk from serious scientific evaluation. (Section 2.4.1.)
29. Section 2.4.1 is filled with generalized conclusions which have no supporting information to justify selections of contaminants of concern. 1,3,5-trimethylbenzene is another of the compounds identified in this section for which no scientifically derived methodology was cited to support exclusion. Comments 26 through 28 address the other compounds.
30. In Section 3.3.1 it is stated that, "volatilization is not as important when evaluating groundwater and

subsurface soils." Please clarify this statement.

31. For the site conceptual model, it seems reasonable to assume that inhalation of volatile contaminants would be a significant source of risk during the watering of lawns, washing of cars, and other similar activities.
32. In Table 3-3 inhalation of volatile constituents in indoor air must be evaluated for the reasons stated in earlier comments. Risks to receptors must be evaluated regardless of source.
33. In Table 3-3 inhalation of fugitive dusts from on-site soils may be legitimately eliminated for evaluation in the risk assessment, hopefully on the basis of screening criteria that are health based and not solely based on visual assessment of a soil covering such as grass.
34. For future use scenarios related to Table 3-3 it is unreasonable to assume that landscaping and a full soil covering will be applied that will limit exposure to fugitive dusts through inhalation.
35. Comments made for Table 3-3 apply to Table 3-4 as well.
36. Statements are made in the first paragraph beginning on page 3-18 which indicate that organic constituents detected in residential wells are not believed to be site related. The reasoning for this statement appears to be speculative. Please justify the statements with scientific data or remove them.
37. It should be noted that this is a baseline risk assessment which evaluates the site as though no remediation or other future action occurs. It is therefore unreasonable to assume that extensive landscaping and other related activities would occur in the future that would prevent certain types of residential exposure to contaminants in the soils. (Page 3-19 first paragraph beginning on that page)
38. It should be noted that although groundwater is not currently being used, future use may occur if the site use changes, if groundwater wells are installed in the area near the site, or if the contaminant plume migrates to some off-site location where receptors may be impacted. Also, please note that groundwater appears to discharge to surface water, via the channels surrounding the Landfill.
39. The evaluation of subsurface soils should be taken into consideration since it is reasonable to assume that in some future point in time, subsurface soils may be brought to the surface through construction activities causes residential or occupational exposure.
40. Statements surrounding the treatment of non-detects cited on page 3-21 are of great concern. There seems to be a great deal of subjective evaluation involved in the process related to evaluation of detection limits. Please define what is meant by the term "artificially high". Additionally, provide a clear explanation for the validated data not having specific detection limits. Please provide the rationale for substituting the most frequently occurring detection limit for a specific parameter in a medium if the detection limit was "artificially high". The approach to non-detects presented in this document may not be appropriate.
41. There appear to be at least two distinct groundwater plumes at the Camp Allen Landfill, therefore, it may be appropriate to evaluate them as separate exposure points. It is also noted that the center of the groundwater plume must be used to calculate the exposure point concentration for risk assessment.
42. Please use the 1992 EPA Dermal Guidance document for the assessment of dermal contact risks due to exposure to groundwater. The non-steady state model should be used. (Section 3.4.2)

43. Inhalation of volatiles during lawn watering, car washing and other related activities should be incorporated into Table 3-5.
44. Please refer to the 1992 dermal guidance document for information related to dermal contact with contaminants in groundwater. (page 3-29)
45. Please note that an inhalation RfD of 1.4286E-04 mg/kg/day has been derived for benzene by EPA-ECAO in 1993. Please make appropriate changes to Table 4-1.
46. An inhalation RfD of 2.86E-03 mg/kg/day is available for 1,2-dichloroethane from ECAO. Oral RfD values of 1.00E-02, 2.00E-02, and 9.00E-03 mg/kg/day respectively are available for cis-1,2-dichloroethene, trans-1,2-dichloroethene, and total 1,2-dichloroethene. Please select the appropriate values and modify Table 4-1 accordingly.
47. Please explain the basis for assuming that the uncertainty associated with not analyzing residential well groundwater samples for semivolatiles, pesticides, PCBs, and inorganics is low with respect to underestimating risk. (Table 6-1).
48. It should be noted that migration of the contaminant plume to off-site locations may impact upon receptors in the future. This should be taken into account in the uncertainty assessment.
49. Please include data validation flags along with all site media data in this document.
50. It is clear from a review of the groundwater data that a very distinct organic contaminant plume exists at this site. Only the groundwater wells that constitute the center of the plume should be used for RME calculation. It should also be noted that the RME calculations for groundwater are incorrect since wells outside the plume were used for deriving calculations. These contaminant values must be calculated again.
51. The total increased carcinogenic risk due to residential ingestion of PAHs in surface soils exceeds 1.0E-06 based on screening calculations.
52. **It should be noted that 1,1,1-trichloroethane was detected in subsurface soils at the site. This raises additional concerns with earlier claims that air concentrations are not site related.**
53. In light of the extremely high concentrations of vinyl chloride and other organic contaminants reported in groundwater at this site, with these high concentrations of contaminants being concentrated in a very small number of wells, there is concern that there may be a DNAPL at this site.
54. Residential well summary data could not be located in this document.
55. There are differences in several parameters used in the calculation of inhalation exposure risks during showering that may make significant differences in the computed risk values for this route. Dr. Smith of EPA-Region III has recommended a shower flow rate of 20 liters per minute instead of the 10 liter per minute rate used by Foster and Chrostowski. It should be noted that toxicologist in this Region have taken direct flow rate measurements which seem to verify this flow rate recommendation. In addition it should be noted that the reasonable maximum exposure is the evaluative objective of these investigations aimed at the protection of sensitive subpopulations. It is therefore imperative that we seek out the reasonable maximum values as to afford protection of all receptors. Dr. Smith also recommends a smaller shower room volume of 2.9 m³. The air exchange rate recommended is 0.0166667 min⁻¹ (range: 0.5 to 1.5 per hour). Please make appropriate adjustments.

56. There is a great deal of concern for the health of any persons exposed to the extremely high levels of volatile contaminants in air reported at this site. As stated previously the air concentration of 1,1,1-trichloroethane reported generates a Hazard Index of 365 for any person regularly exposed. This risk should not be tolerated. What is most disturbing is that this contaminant was not even assessed in the Baseline Risk Assessment.
57. It should be noted that vinyl chloride was reported in surface water at high levels. It is unusual to detect this contaminant in surface water because it volatilizes rapidly. The fact that it was detected in this medium reflects the magnitude of risk exhibited at this site.
58. More comprehensive air monitoring should be required at this site, particularly in the vicinity of the elementary school, due to the detections of volatile compounds in the air and surface water.
59. The statements related to linear regression analyses of inorganic groundwater data mentioned in the executive summary are not documented.
60. It should be noted that a connection exists between the two aquifers at the site. This information should have considerable bearing on any site evaluation and assessment.
61. In light of comments presented, risk calculations will need revision for a number of pathways, contaminants of concern must be re-evaluated, exposure parameters adjusted, monitoring wells representing the center of the contaminant plumes should be utilized only, and correction need to be made with respect to toxicity values. Complete background data and comprehensive summary tables, complete sample data with appropriate data qualifiers, sample detection limits, and documentation for concerns identified in this review should be incorporated into this report.

Draft Final Feasibility Study

The Draft Final *Feasibility Study* for the Camp Allen Landfill at the Norfolk Naval Base has been reviewed. A number of concerns and deficiencies were noted and comments are as follow:

1. In light of the numerous concerns with respect to the risk assessment, it is obvious that the assumptions upon which the Feasibility Study is based should be reviewed.
2. High levels of vinyl chloride were detected in surface water at the site, these contaminant levels are of concern. It is appropriate to address surface water risk directly.
3. In Section 5.2 it is stated that cleanup levels are developed for soils and groundwater. No calculations for soil or groundwater cleanup levels could be located in the document.
4. It is difficult to understand how sediments could have satisfactorily been evaluated when sediments were not fully assessed in the Baseline risk assessment. (ES-5-4)
5. Since the two aquifers are interconnected and groundwater from the lower aquifer is used away from the site, it seems quite likely that contaminants may migrate off-site.
6. Contaminants were detected in residential wells, contrary to statements in the FS.
7. Soil cleanup levels for the protection of groundwater should have already been developed.
8. Cleanup levels based on MCLs are inappropriate. Risk based cleanup levels should be developed for

all contaminants. It should be noted that many MCLs of volatile contaminants have derived cancer risks greater than 1.0E-06.

9. Groundwater should be evaluated, at a minimum, for clean-up to beneficial use. The use of the term "clean-up to nonpotable groundwater standards" has no meaning and should be eliminated from the document.
10. Air risks which are considerable should be assessed.
11. Since organic contaminants were identified in residential wells and contaminants other than volatiles were not evaluated in these wells, satisfactory assessment of residential wells for remedial purposes is not possible.
12. Inorganic contaminants in groundwater were not satisfactorily addressed in the risk assessment, and consequently are not adequately addressed in the FS.
13. The FS needs revision based upon comments on the Baseline Risk Assessment.
14. All cleanup level calculations should be included in this document.

This concludes EPA's preliminary review of the draft final *Remedial Investigation Report, Baseline Risk Assessment, and Feasibility Study* for the Camp Allen Landfill at the Norfolk Naval Base, Virginia. If you have any questions regarding the above, please feel free to call me at (215) 597-1110,

Sincerely,



Robert Thomson, PE
VA/WV Superfund Federal Facilities (3HW71)

cc: Lisa Ellis (VDEQ, Richmond)
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